
Political, Economic, Social and Technical impacts of the Internet

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March 2013



908.5 Million

*(ftp.isc.org/www/survey/reports/current/
Sep 2012)*

2.405 Billion Users

(InternetWorldStats.com, Jun 30, 2012)

(approx. 6.5 B mobiles and >1.5 Billion PCs)

Regional Internet Statistics 6/30/2012



Region	Internet Population	% penetration
Asia	1,070 Mil.	27.5 %
Europe	518.5 Mil.	63.2%
North Am.	273.8 Mil.	78.6 %
LATAM/C	254.9 Mil.	42.9 %
Mid-East	90.0 Mil.	40.2 %
Oceania/Aus	24.3 Mil.	67.6 %
Africa	167.3 Mil.	15.6 %
TOTAL	2,405.5 Mil.	34.3%

- IPv6 - in parallel with IPv4 [IPv6 World Launch 6/6/2012]
- Internationalized Domain Names
- New gTLDs (2000 applications)
- Domain Name System Security (DNSSEC)
- Digitally-Signed Address Registration (RPKI)
- Sensor Networks
- Smart Grid
- Mobile Devices

Internet-enabled Devices





Woodhurst sensor net

2008-09-21 4:16:38 pm EDT

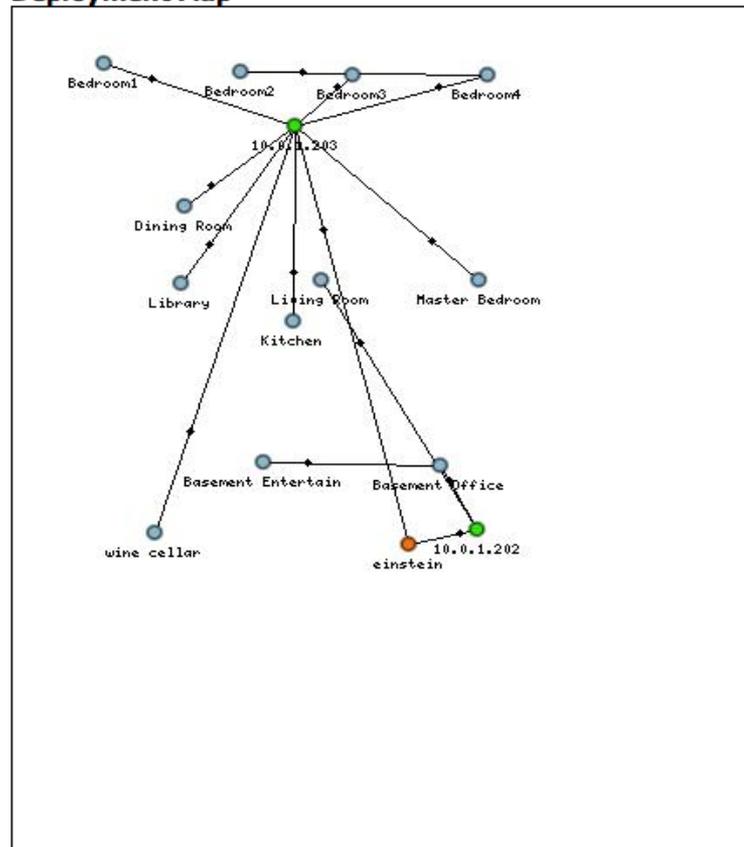
[Help on this Page](#)
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[Home](#)
[Setup](#)
[Server](#)
[Routers](#)
[Nodes](#)
[Software Update](#)
[System and Network](#)
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[Sensing and Control](#)
[Sensor/Actuator Devices](#)
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[Data Export](#)
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[User Guide](#)
[Network Admin Guide](#)
[Developer Guide](#)

Home

● Server
 ● Router
 ● Node
 ● Missing Router or Node

Deployment started on 2008-07-11 12:35:48 pm EDT, running for 72d 3h 40m 51s.

Deployment Map



Network Devices

15 Devices

● einstein

● 10.0.1.202

4:15:01 pm

● 10.0.1.203

4:15:00 pm

1st Floor

● Dining Room

4:15:05 pm

71 °F 55.3 % 10 lux 1 lux

● Kitchen

4:12:03 pm

72.9 °F 51 % 21 lux 1 lux

● Library

4:12:35 pm

73.3 °F 50.1 % 10 lux 0 lux

● Living Room

4:14:57 pm

70.4 °F 51.5 % 7 lux 0 lux

● Master Bedroom

4:15:13 pm

70.1 °F 56 % 14 lux 2 lux

2nd Floor

● Bedroom1

4:12:14 pm

74 °F 48 % 14 lux 1 lux

● Bedroom2

4:15:10 pm

74.4 °F 49 % 80 lux 17 lux

● Bedroom3

4:15:12 pm

73.5 °F 47.9 % 14 lux 1 lux

● Bedroom4

4:15:06 pm

70.7 °F 56.7 % 3 lux 0 lux

I wish this page would...

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- Residential
 - Single Controller? Local? Remote? Multiple? More than one/device?
 - Third party management? (e.g. entertainment)
 - Apartments/Condos vs Single Family
 - Wireless? Wired? Mix?
- Factory Floor
 - Almost certainly multiple controllers, grouped by functionality?
 - Hierarchical or heterarchical control?
- Device to Device Interaction?
 - Store/Forward MANET/FANET (no pun intended)
- Autonomous System Model?

- IP address selection
 - Assignment? Auto-generation? Uniqueness? Incremental?
- Auto-discovery?
 - Periodic probing? Announcements? Manual?
 - Authentication/membership confirmation
 - Among devices
 - Between devices and controllers
 - Strong authentication tools (think BlueTooth)
- Does every device have a display?
- Can you use Web Tools (protocols) to configure?
- What state information should be available/settable?
 - Polling? Automatic alerts? Gets and Sets (SNMP?)
- How to avoid/prevent hijack and accidental joinings?

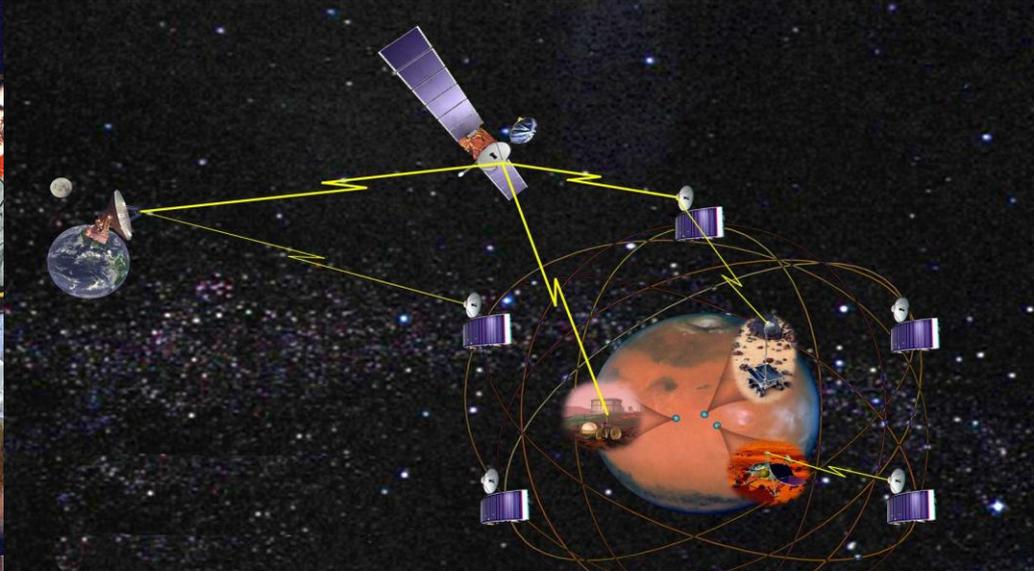
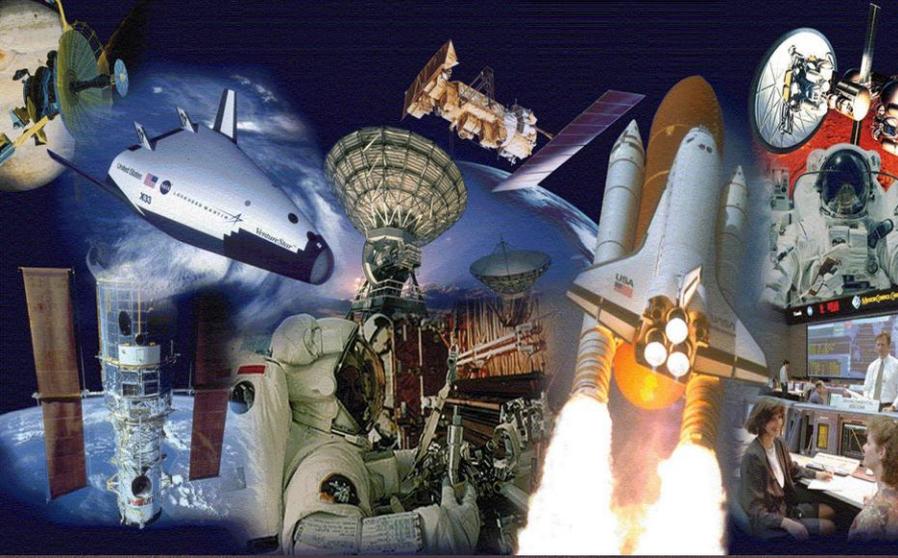
- SET TOP BOX example (FIOS)
 - Cable provider configures
 - Cable provider operates controller
 - Cable provider offers web access to control system (limits user action)
 - STBs can interact (e.g. DVR controls)
- Arch Rock/Cisco
 - Manual configuration of IP addresses (V6/V4)
 - MANET operation + store/forward
 - Additional routers
 - Controller w/Web Interface for local management
- Diversity vs Uniformity of devices and function

- Smart Grid Interoperability Panel (SGIP)
- SEP 2.0 (Smart Energy Profile)
- Configuration, Control, Reporting
- Safety and Security
- Consumption vs Production
 - Solar, generators, wind, electric vehicles
- User settings?
- Multiple receivers of information? (Analytics)

- Internet Governance Forum
- International Telecommunication Union (ITU)
 - World Telecommunication Standardization Assembly (WTSA)
 - World Conference on International Telecommunications (WCIT) – International Telecommunication Regulations
- Privacy, Safety (vs security)
 - Cyber Fire Department (civilian infrastructure)
 - Anonymity and strong authentication
- The legal meaning/weight of digital signatures
- Intellectual Property (copyright, patents esp. software)
- Digital Vellum (preservation of data and software)

- OPENFLOW – New thinking about routing/flow management
 - Scaling issues (centralization, information latency)
 - Border Gateway Protocol for OPENFLOW networks?
 - Beyond addressing
- Configuration management and access control in the Internet of Things
- Re-thinking Certificates and Certification (“CA Problem”)
- Role of Trusted Computing Modules in O/S design (HW/SW)
- Paranoid browsers and sandboxes
- Inter-cloud protocols and architecture
- Delay and Disruption Tolerant Networking and Public Safety Nets

- The economics of publishing (atoms to bits)
- The economics of journalism (tomes to snippets)
- The economics of education (blackboards to MOOCs)
- The economics of manufacturing (3D printers)



InterPlaNetary Internet



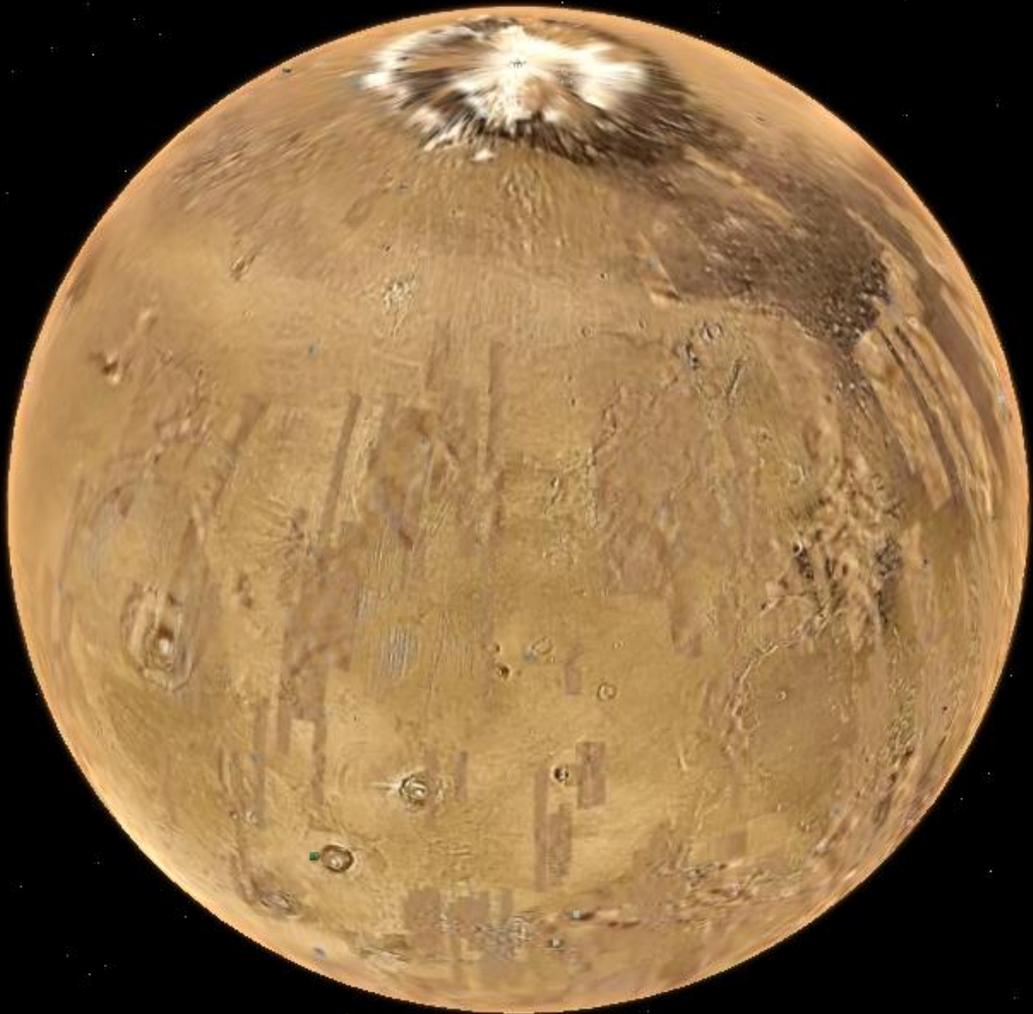
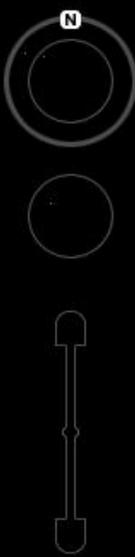
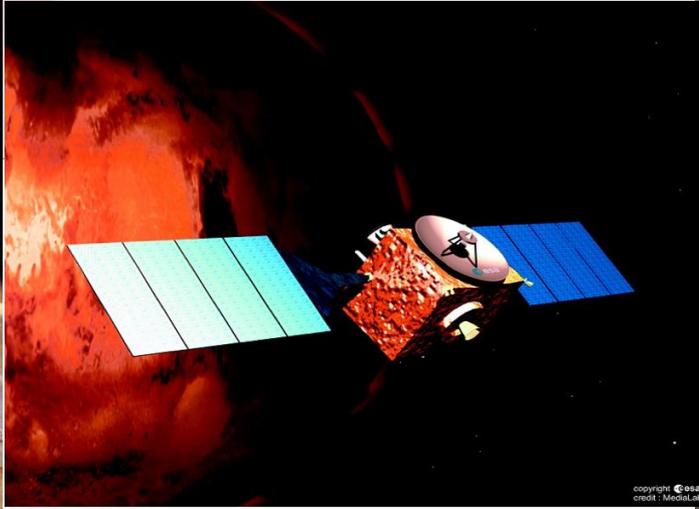
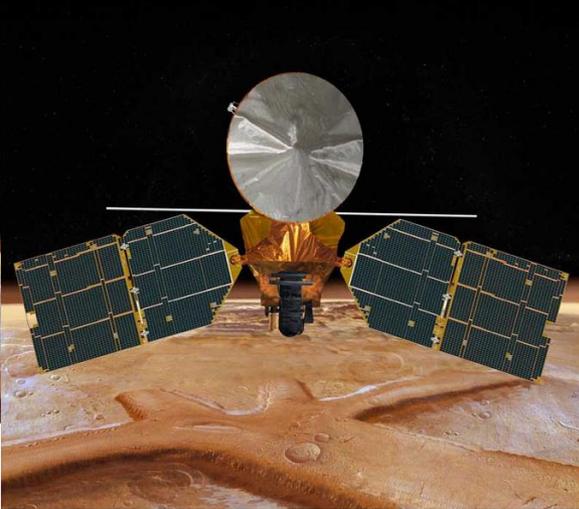


Image NASA / USGS
ESA / DLR / FU Berlin (G.Neukum)

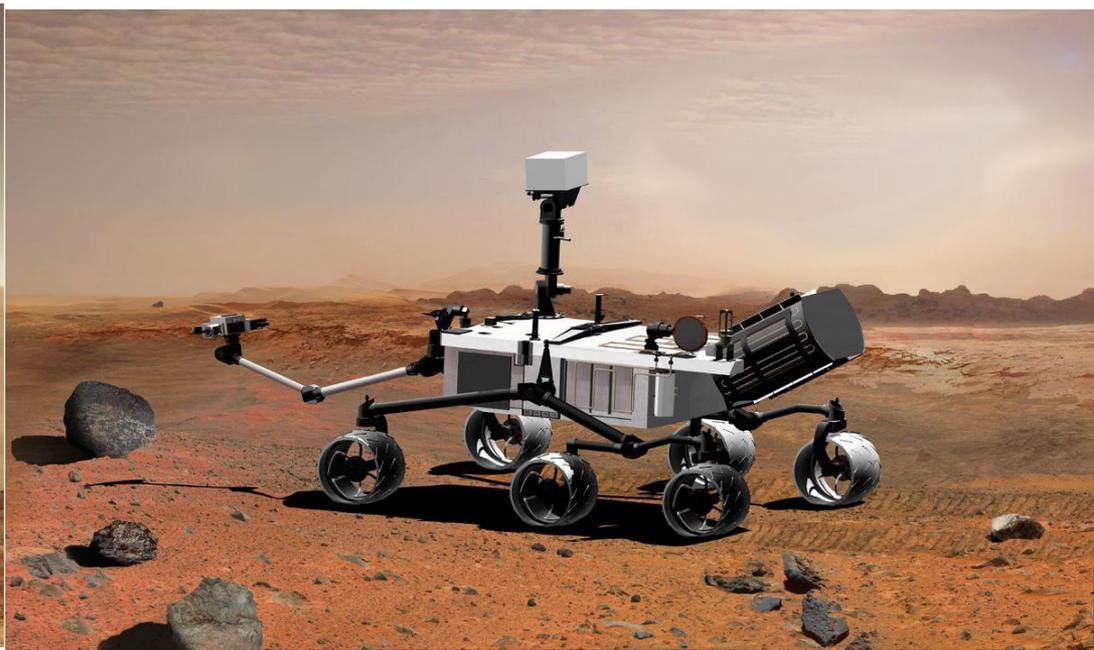
38°57'34.00" N 95°15'55.87" W elev 422 m



Eye alt 11001.42 km



*MARS RECONNAISSANCE ORBITER, MARS EXPRESS,
PHOENIX, MARS ROVERS, MARS SCIENCE LABORATORY*

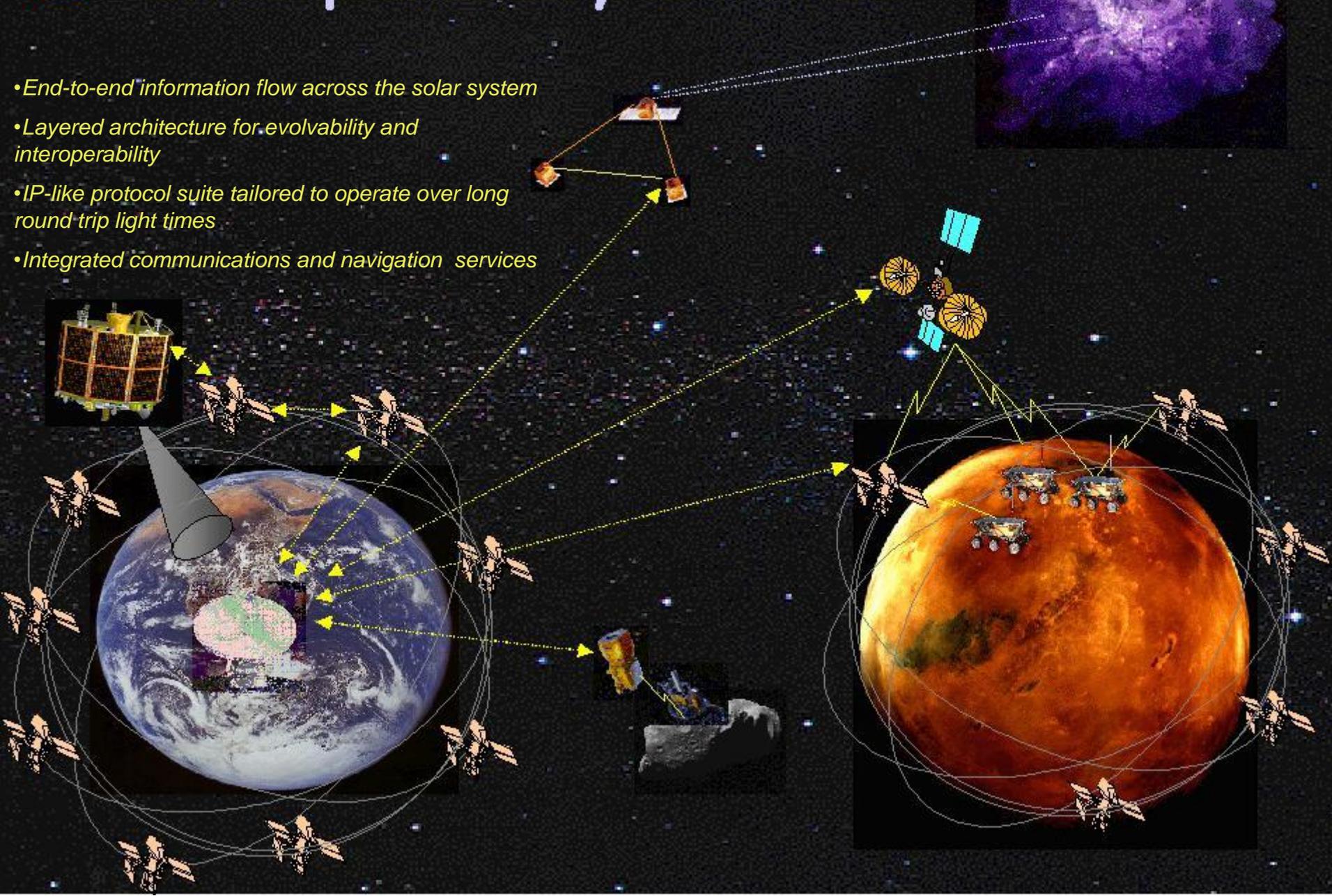




Interplanetary Internet



- End-to-end information flow across the solar system
- Layered architecture for evolvability and interoperability
- IP-like protocol suite tailored to operate over long round-trip light times
- Integrated communications and navigation services



Next Stop: Alpha Centauri (DARPA 100YSS)

